



Authorizations and Permits for Protected Species (APPS)

File #: 20528

Title: Atlantic and Shortnose Sturgeon Scientific Re

Modification: 7

File Number: 20528

Applicant Information

Affiliation: South Carolina Department of Natural Resources

City,State,Zip: Charleston, SC

Project Information

File Number: 20528

Application Status: **Application Complete**

Project Title: Atlantic and Shortnose Sturgeon Scientific Research in SC Rivers

Project Status: New

**Previous Federal or State
Permit/Authorization:** 16442,15677, 1505

**Permit/Authorization
Requested:**

- ESA Section 10(a)(1)(A) permit (other) - Issued

**Where will activities
occur?** US Locations including offshore waters

Research Timeframe: **Start:** 03/31/2017 **End:** 03/31/2027

**Sampling Season/Project
Duration:** Sampling will occur primarily in late winter and early spring (to intercept staging adults) and summer (at the freshwater-saltwater interface) approximately 1-3 days per week throughout the duration of the study, following the NMFS shortnose sturgeon survey protocol (Kahn and Mohead 2010).

Abstract: The purpose of these studies will be to determine the presence, status, health, habitat use, and movements of Atlantic sturgeon (*Acipenser oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) in South Carolina waters (Savannah, Edisto, Cooper, and Santee rivers and the Winyah Bay System). Our studies will involve netting (using multi-mesh gillnets or trammel nets) in order to capture shortnose and Atlantic sturgeon. Proposed activities include standardized capture, measurement, tagging, and recapture of up to 1,020 Atlantic sturgeon and up to 260 shortnose sturgeon annually. A subset of these will be used for acoustic telemetry (100 ATS and 80 SNS annually). Additionally, extensive mark/recapture studies are also scheduled to occur in these rivers with all procedures adhering to NMFS sturgeon protocols (Kahn and Mohead 2010). We are requesting a permit of ten-year duration.

Project Description

Purpose: The purpose of these studies will be to determine the presence, status, and movements of Atlantic and shortnose sturgeon in South Carolina waters (Pee Dee, Santee, Cooper, Edisto, and Savannah Rivers). This will involve netting (using multi-mesh gillnets or trammel nets) in order to capture shortnose and Atlantic sturgeon. Proposed activities include standardized capture, species identification, measurement, tagging, and recapture of up to 1,020 Atlantic sturgeon and up to 260 shortnose sturgeon annually. A subset of these will be used for acoustic telemetry (100 ATS and 80 SNS annually). Additionally, extensive mark/recapture studies are also scheduled to occur in these rivers. All procedures would adhere to NMFS sturgeon protocols (Kahn and Mohead 2010).

Justification of Studies
Results from these projects will continue to advance current understanding of Atlantic and shortnose sturgeon populations within South Carolina waters; and data would be used by both state and federal agencies to define appropriate management units, recovery actions, and key habitats. Specifically, these studies would clarify existing data gaps for sturgeon, informing the ongoing efforts of Federal Energy Regulatory Commission (FERC) to regulate the deepening of the Charleston Harbor, and also support the Atlantic States Marine Fisheries Commission's (ASMFC) sturgeon stock assessment focused on quantifying the various life stages of sturgeon species occurring in South Carolina waters.

Research Objectives:

Life Stages Defined:
We define small juvenile Atlantic sturgeon as <500 mm fork length (FL), juvenile Atlantic sturgeon as 500mm > x< 1000mm; sub-adult Atlantic sturgeon as (1000> and <1300 mm FL) and adult Atlantic sturgeon as >1300 mm FL. We also define juvenile shortnose sturgeon as <450 mm FL, sub-adults as 450> and <600 mm FL, and adults as >600 mm FL.

Santee River (100 Atlantic sturgeon and 50 shortnose sturgeon, annually)
a. conduct a telemetry study to monitor adult and juvenile sturgeon movements to better understand overall sturgeon habitat use and potential impacts of barriers to spawning and migration in the system
b. assess relative abundance and population stock structure for both Atlantic and shortnose sturgeon
c. assess annual recruitment of Atlantic and shortnose sturgeon

Justification of Studies
These studies will provide information that will be useful to ongoing Section 7 consultations and will help to fill data gaps that were identified by the most recent Atlantic States Marine Fisheries Commission (ASMFC) stock assessment.

Cooper River (50 Atlantic sturgeon and 70 shortnose sturgeon, annually)
a. conduct a telemetry study to monitor adult and juvenile sturgeon movements to better understand overall sturgeon habitat use, and potential impacts of barriers to spawning and migration in the system
b. assess relative abundance and population stock structure for both Atlantic and shortnose sturgeon

c. determine if spawning occurs, and if so evaluate recruitment

Justification of Studies

These studies will provide information that will be useful to ongoing Section 7 consultations and will help to fill data gaps that were identified by the most recent ASMFC stock assessment. In addition, information on sturgeon use of the lower Cooper River and Charleston Harbor is needed to minimize impacts of planned efforts to deepen the Charleston Harbor.

Edisto River (750 Atlantic sturgeon and 20 shortnose sturgeon, annually)

a. continue to monitor Atlantic sturgeon relative abundance and assess annual recruitment

b. conduct a telemetry study to monitor the movement of adult sturgeon in coordination with other telemetry studies performed by SCDNR in the Edisto River

c. conduct a study to locate and assess spawning areas

Justification of Studies

These studies will provide information that is needed to fill data gaps that were identified by the most recent ASMFC stock assessment.

Savannah River (120 Atlantic sturgeon and 120 shortnose sturgeon, annually)

a. conduct a telemetry study to monitor the distribution of adult and juvenile sturgeon in the Savannah River Estuary before, during, and post construction of the Savannah Harbor Expansion Project (SHEP).

Justification of Studies

These studies will continue to build upon recent telemetry study results completed by SCDNR. The continuance of this work is mandated by NMFS in the SHEP Biological Opinion for the Savannah Harbor deepening and are a direct result of NMFS Section 7 consultation with the United States Army Corps of Engineers (USACE).

Description: The Atlantic sturgeon (*Acipenser oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*) are anadromous species with ranges including most of the Atlantic coast of the United States. Shortnose sturgeon have been listed on the Endangered Species Act (ESA) since the late 1960's and the Atlantic sturgeon were listed in 2012. The status of sturgeon populations in many southern rivers remain uncertain; however, this is quickly changing due to ongoing research. SCDNR will continue to conduct a telemetry program, mark/recapture, and assess population dynamics in SC Rivers. Telemetry studies will be used to gain a better understanding of riverine and near coastal movements of both species of sturgeon on a coast-wide "big picture" basis, identify potential spawning areas, and monitor sturgeon movements in response to habitat alterations. Acoustic receivers will be downloaded and data will be shared with other researchers and also stored in a central data base. Benefits of this program will address specific goals and recommendations for sturgeon as outlined in Recovery and State Action Plans. In addition to telemetry studies, SCDNR will evaluate population stock structure, age structure, and monitor annual recruitment of both species in the Santee, Cooper, and Edisto Rivers; and assess adult sturgeon relative abundance in the Cooper and Savannah Rivers.

Description of Action Area

Projects will occur throughout South Carolina in river, estuary, and marine environments. South Carolina's larger watersheds are characterized by many (generally about 200-300) miles of meandering river courses with adjacent floodplains within the Coastal Plain of the state (Pee Dee, Santee, and Savannah River). At the fall line, rapid changes in elevation resulted in natural impediments to fish migration, except during periods of high flow when waterfalls became passable. Reservoirs now occur on the Savannah and Pee Dee Rivers near and inland of the fall line. A dam in the Coastal Plain on the Santee River at river mile 90 submerges much of the historical river channel habitat within Lake Marion. In the 1940's the Santee River was directly connected to the Cooper River. The connection was made by building Santee Dam on the Santee River creating Lake Marion, then Lake Moultrie was constructed by diking and the two lakes were connected via a canal. Pinopolis Dam was constructed on Lake Moultrie and a ~ 4 mile tailrace canal was dug to deliver the majority of the Santee River flow into the Cooper River. Prior to the diversion of the Santee River, the Cooper River was a coastal plain, tidally influenced tributary to Charleston Harbor. In 1985, a ~12 mile rediversion canal and St. Stephen Dam were completed that rerouted a majority of the Santee River flow back to the historical Santee River channel at river mile 53. The Edisto River, completely within the state's Coastal Plain, has equally sinuous channels and adjacent wetlands and provides less than 150 river miles of channel habitat. The Edisto River is undammed throughout its entire course. Generally, river courses within the Coastal Plain provide

freshwater habitat inland of about river mile 30 during spring. The description of the action area is illustrated by the following:

(https://www.google.com/maps/d/edit?ll=32.852678%2C-80.19702&spn=1.68432%2C2.469177&hl=en&t=h&msa=0&z=9%3E&ie=UTF8&mid=1pX0b_TpIVIANe6kso4ICLDffVic).

Atlantic sturgeon (Carolina DPS) and shortnose sturgeon

Santee River

In order to better understand potential impacts of barriers to migrations of Atlantic and shortnose sturgeon in the system, a monitoring study using telemetry gear will be utilized throughout the Santee River, from the Santee Dam to the Atlantic Ocean. The primary objectives of this study are to evaluate the status, distribution, and population stock structure of Atlantic and shortnose sturgeon in the Santee River. SCDNR will sample year-round, 1-3 days/week with the exclusion of days when water temperature exceeds 28°C. Set nets and drift nets with mesh sizes ranging from 3-9" stretched mesh will be fished throughout a slack tide (high or low) mostly from river mile 5-22. SCDNR plans to capture up to 100 Atlantic sturgeon (Take Table 1 Lines 1- 4) and 50 shortnose sturgeon annually (Take Table 1 Lines 5 - 8). Each fish will be identified based on width inside lips in relation to bony interorbital width, measured (total length TL and fork length FL), receive a passive integrated transponder (PIT) tag and a dart tag which will be injected or inserted at the base of the dorsal fin. A fin ray clip will be taken for aging purposes, and tissue samples will also be collected for genetic analyses. Annually, up to 10 sub-adult/adult Atlantic sturgeon (>100cm FL) and 10 sub-adult/adult shortnose sturgeon (>45 cm FL) will receive an acoustic transmitter (Vemco V-16, Inc.) with a life span of 5 years, and up to 10 juvenile Atlantic sturgeon (<100cm FL) and 10 juvenile shortnose sturgeon (<45 cm FL) will receive an acoustic transmitter (Vemco V-7, Inc) with a life span of 183 days (Take Table line 1-2, Atlantic Sturgeon; and line 5-6, shortnose sturgeon). Gonadal tissue samples may be collected to verify sex of individuals internally tagged with acoustic transmitters. Following implantation, the condition of the fish will be assessed and it will be released at the original capture site. Fish location will be documented during downloads of an already established array of acoustic receivers. Genetic samples from each fish will be collected, cataloged, and analyzed to determine the sturgeon's genetic assignment. Water quality data (dissolved oxygen, salinity, and temperature) will also be recorded during each download and net set. Results of this study should determine presence/absence, discern distinct annual movements, characterize population stock structure, document relative abundance, and identify potentially important habitats for sturgeon within the project area. This information is key in determining potential impacts of the South Carolina Public Service Authority Hydroelectric Project in the Santee River. In addition, receiver data will also be used to identify sturgeon from other river systems and potentially help assist to distinguish the degree of mixing that occurs between populations. Multi-year sampling through the previous study has allowed SCDNR to document multiple sturgeon from other rivers using the project area.

Cooper River

The primary objectives of this study will be to evaluate the status, distribution, and population structure of sturgeon in the Cooper River, and potential reproduction and recruitment of Atlantic and shortnose sturgeon in the Cooper River. SCDNR will sample year-round, 1-3 days/week with the exclusion of days when water temperature exceeds 28°C. Set nets and drift nets with mesh sizes ranging from 3-9" stretched mesh will be fished throughout a slack tide (high or low) mostly from river mile 4-48. SCDNR plans to capture up to 50 Atlantic sturgeon (Take Table 2 Lines 1 - 4) and 70 shortnose sturgeon annually (Take Table 2 Lines 6 - 9). Each fish will be identified based on width inside lips in relation to bony interorbital width, measured (total length TL and fork length FL), receive a passive integrated transponder (PIT) tag and a dart tag which will be injected or inserted at the base of the dorsal fin. A fin ray clip will be taken for aging purposes, and tissue samples will also be collected for genetic analyses. Annually, up to 20 adult Atlantic sturgeon (>100cm FL) and up to 20 adult shortnose sturgeon (>45 cm FL) will receive an acoustic transmitter (Vemco V-16, Inc.) with a life span of 5 years, and up to 10 juvenile Atlantic sturgeon (<100cm FL) and up to 10 juvenile shortnose sturgeon (<45 cm FL) per year will receive an acoustic transmitter (Vemco V-7, Inc) with a life span of 183 days (Take Table 2 line 1-2, Atlantic sturgeon; and line 6-7, shortnose sturgeon). Gonadal tissue samples may be collected to verify sex of individuals internally tagged with acoustic transmitters. Following implantation, the condition of the fish will be assessed and it will be released at the original capture site. Fish location will be documented during downloads of an already established array of acoustic receivers. Additionally, egg mats and/or D-shaped plankton nets will be used to assess spawning areas for collection of up to 50 eggs per year for each species (Atlantic and shortnose sturgeon) over the 5 year permit period (Take Table 2 line 5, Atlantic sturgeon; and line 10, shortnose sturgeon). Water quality data (dissolved oxygen, salinity, and temperature) will be recorded during each receiver download and net set. Results of this study should discern distinct annual movements, characterize population stock structure, document relative abundance, assess reproduction, and identify essential habitats for sturgeon within the project area.

Atlantic sturgeon (South Atlantic DPS) and shortnose sturgeon

Edisto River

SCDNR will continue monitoring Atlantic sturgeon abundance in the Edisto River. This is an ongoing program that began in 1994 and is one of the few long term studies being used for the 2017

stock assessment. Sampling will occur from May-October, 1-3 days/week, with the exclusion of days when water temperature exceeds 28°C. Sturgeon are captured using a 150 yd drift gill net with 5" stretch mesh and 2.5" stretch mesh near the bottom half. The smaller mesh is used to assess recruitment of sturgeon less than 45cm FL (shortnose sturgeon) and less than 100cm FL (Atlantic sturgeon). Most of the sampling effort will occur near Jehossee Island in the ACE Basin National Wildlife Refuge. SCDNR plans to capture up to 750 Atlantic sturgeon (Take Table 3 Lines 1 - 4) and 20 shortnose sturgeon annually (Take Table 3 Lines 6 - 9). Recent genetic analysis indicated this population has an effective population size comparable to the Altamaha River, GA which has been stated is the largest population in the southeast. Additionally, mark recapture data using Program Mark indicated as many as 1192 (95% CI, 701-1522) are present at the fixed site sampling location. This minimum estimate for one site fluctuates, but is heavily dependent upon environmental conditions during the sampling season. Each captured fish will be identified based on width inside lips in relation to bony interorbital width, measured (total length TL and fork length FL), receive a passive integrated transponder (PIT) tag and a dart tag which will be injected or inserted at the base of the dorsal fin. A fin ray clip will be taken for aging purposes, and tissue samples will also be collected for genetic analyses. Annually, up to 20 sub-adult/adult Atlantic sturgeon (>100cm FL) and up to 5 sub-adult/adult shortnose sturgeon (>45 cm FL) will receive an acoustic transmitter (Vemco V-16, Inc.) with a life span of 5 and, up to 10 juvenile Atlantic sturgeon (<100cm FL) and up to 5 juvenile shortnose sturgeon (<45 cm FL) per year will receive an acoustic transmitter (Vemco V-7, Inc) with a life span of 183 days (Take Table 3 line 1-2, Atlantic sturgeon; and line 6-7, shortnose sturgeon). Gonadal tissue samples may be collected to verify sex of individuals internally tagged with acoustic transmitters. Following implantation, the condition of the fish will be assessed and it will be released at the original capture site. Fish location will be documented during downloads of an already established array of acoustic receivers. Standardized netting efforts will also be conducted bi-weekly in order to establish catch data to be used in determination of stock structure and a possible population estimate. Additionally, egg mats and/or D-shaped plankton nets will be used to assess spawning areas and up to 50 eggs of each species (Atlantic and shortnose sturgeon) will be collected annually over the 5-year permit (Take Table 3 line 5, Atlantic sturgeon; and line 10, shortnose sturgeon). Water quality data (dissolved oxygen, salinity, and temperature) will be recorded during each receiver download and net set. Results of this study should discern distinct annual movements, characterize population stock structure, document relative abundance, assess reproduction, and identify essential habitats for sturgeon within the project area.

Savannah River

As part of the Savannah Harbor Expansion Project (SHEP), the US Army Corps of Engineers, Savannah District (USACE) committed to monitor the distribution of sturgeon in the Savannah River Estuary, and SCDNR will conduct telemetry studies before, during, and post construction. SCDNR will sample year-round, 1-3 day/week with the exclusion of days when water temperature exceeds 28°C. Sturgeon will be captured with set and drift nets with mesh sizes ranging from 3-9" stretched mesh, fished mostly from river mile 17-31. SCDNR plans to capture up to 120 Atlantic sturgeon (Take Table 4 Lines 1 - 4) and 120 shortnose sturgeon annually (Take Table 4 Lines 6 - 9). Each fish will be identified based on width inside lips in relation to bony interorbital width, measured (total length TL and fork length FL), receive a passive integrated transponder (PIT) tag and a dart tag which will be injected or inserted at the base of the dorsal fin. Tissue samples will also be collected for genetic analyses. Annually, up to 10 sub-adult/adult Atlantic sturgeon (>100cm FL) and up to 10 sub-adult/adult shortnose sturgeon (>45 cm FL) will receive an acoustic transmitter (Vemco V-16, Inc.) with a life span of 5 years, and up to 10 juvenile Atlantic sturgeon (<100cm FL) and up to 10 juvenile shortnose sturgeon (<45 cm TL) per year will receive an acoustic transmitter (Vemco V-7, Inc) with a life span of 183 days (Take Table 4 line 1 - 2, Atlantic sturgeon; and line 6 - 7, shortnose sturgeon). Gonadal tissue samples may be collected to verify sex of individuals internally tagged with acoustic transmitters. Following implantation, the condition of the fish will be assessed and it will be released at the original capture site. Fish location will be documented during downloads of an already established array of acoustic receivers. Additionally, egg mats and/or D-shaped plankton nets will be used to assess spawning areas and up to 50 eggs of each species (Atlantic and shortnose sturgeon) will be collected annually over the 5-year permit (Take Table 4 line 5, Atlantic sturgeon; and line 10, shortnose sturgeon).

Research conducted under Biological Opinions

Atlantic and shortnose sturgeon collected under other ESA authority (Incidental Take Statements or Incidental Take Permits) will be used to further research objectives, but are not included as part of this 10(a)(1)(A) permit.

Winyah Bay System including Pee Dee River

- a. conduct a telemetry study to monitor adult sturgeon movements and spawning behavior in response to altered flow and water quality improvements in the Great Pee Dee River
- b. determine sturgeon movement patterns, utilization of newly created habitat, and general trends in the adult populations of Atlantic and shortnose sturgeon

Justification of Studies

These studies are a direct result of Federal Energy Regulatory Commission (FERC) Section 7 consultation with National Marine Fisheries Service (NMFS) (NMFS Consultation No. SER-2009-5521). These takes are not included in the 10 (a) 1 (a) permit.

Pee Dee River and Winyah Bay Watershed

As part of the requirements of the Biological Opinion (Consultation No. SER-2009-5521) for shortnose and Atlantic sturgeon issued by the National Marine Fisheries Service (NMFS), Duke Energy will enlist the services of SCDNR to conduct a telemetry study to monitor the movement of adult sturgeon in coordination with other telemetry studies performed by SCDNR in the Yakin Pee Dee (YPD) River Basin. Atlantic sturgeon takes are included here, but will not be included as part of this permit. Year-round monitoring will occur in the 88-mile stretch of river downstream of Blewett Falls Dam (RM 188.2) to Florence, SC at the U.S. Highway 76/301 Bridge (RM 100.2), with a focus on the 23-mile stretch of river from Blewett Falls Dam to Cheraw, SC near the Highway 1 Bridge (RM 164.8). Migration monitoring will be conducted by collecting and tagging adult Atlantic and shortnose sturgeon during February-September with internal VEMCO acoustic transmitters. Although gravid females caught will not be tagged, males and non-gravid females may be tagged. The general objectives of the monitoring measures are to assess trends in Atlantic and shortnose sturgeon movement and spawning behavior, as well as general trends in the adult populations of the sturgeon species at issue in the YPD River after implementation of the flow and water quality improvements of the new license for the Project. In years 1 and 2 of the project, SCDNR plans to capture and internally tag up to 70 adult Atlantic sturgeon and 40 adult shortnose sturgeon, of which 50 Atlantic sturgeon and 20 shortnose sturgeon will be used for telemetry purposes. In years 3, 4, and 5 of the project, SCDNR plans to capture up to 40 adult Atlantic sturgeon and 40 adult shortnose sturgeon, of which 20 Atlantic sturgeon and 20 shortnose sturgeon will be used for telemetry purposes. Field work will include gillnetting (using gillnets, 7-14" stretched mesh), PIT tagging, species identification based on width inside lips in relation to bony interorbital width, recording biological information (length and weight), and tissue sampling. Results from this long term study should continue to provide information on potential spawning habitat, migratory movement trends, and relative abundance of adult sturgeon in the Pee Dee River.

Description of Research Activities:

Capture Methods:

Adult/juvenile fish would be captured using a standardized netting protocol (anchored gill or trammel nets) year-round, 1-3 day/week with the exclusion of days when water temperature exceeds 28°C. All sampling and handling of sturgeon would be conducted following the guidelines established in "A Protocol For the Use of shortnose, Atlantic, Gulf and Green sturgeon" (Kahn and Mohead 2010) and as supplemented by other NMFS guidance. All necessary precautions would be taken to ensure sturgeon are not harmed during capture and handling.

Netting:

Various mesh sizes of gill and trammel nets would be used to most effectively capture targeted sturgeon life stage. Gillnets with stretched mesh 3-5" would be used to capture juvenile Atlantic and shortnose sturgeon, gillnets with stretched mesh 5-9" would be used to capture adult shortnose sturgeon and subadult Atlantic sturgeon, and gillnets with stretched mesh 10-14" would be used to capture adult Atlantic sturgeon. Trammel nets with inner mesh of 3.5" stretched mesh and outer mesh of 15" would be used to sample for adult shortnose sturgeon and subadult Atlantic sturgeon. Nets would typically be 110 yards in length and six feet deep, although shorter nets may sometimes be used depending on areas used. Netting would cease in waters above 28°C. The maximum net set duration would be 2 hours (20-25°C) and 1 hour (25-28°C). Nets would be set in waters having dissolved oxygen (D.O.) concentrations no less than 4.5 mg/L.

Handling and Processing:

To minimize stress during capture and handling, all sturgeon would be held in a net pen or in on-board live wells until they are processed at which time they would be transferred by hand to a processing station on board the research vessel. During processing, each fish would be immersed in a continuous stream of water supplied by a pump/hose assembly mounted over the side of the research vessel. Sturgeon species would be confirmed by a qualified biologist. Sturgeon will be measured, weighed, PIT/dart tagged, and genetically tissue sampled. The total time required to complete routine procedures would be approximately 2 to 3 min. Following processing, fish will be returned to the live well to ensure full recovery prior to release, except those adults (see below) scheduled to receive telemetry tagging. After processing, fish will be released. Total holding time may be variable depending on water temperature and the condition of each fish, however no fish will be held longer than 30 minutes from the time of capture to the time it is released, unless it has not recovered from anesthesia.

PIT and External Tagging:

Prior to PIT tagging, the entire dorsal surface of captured sturgeon would be scanned using a PIT tag reader to detect PIT tags of previously captured fish. All unmarked sturgeon (>300 mm TL) would be tagged using 11.9 mm x 2.1 mm PIT tags injected using a 12 gauge needle at an angle of 60 to 80° in the dorsal musculature (left and just anterior to the dorsal fin). No fish would be double-tagged with PIT tags. In addition, all PIT tagged fish will also receive a dart tag which will be injected or inserted at the base of the dorsal fin.

Genetic Tissue Sampling:

Genetic information from sturgeon would be obtained by collecting a small (1.0 cm²) soft tissue sample from the trailing margin of soft tissue of one of the pectoral fins or caudal fin using sharp sterilized scissors. Tissue samples would be preserved in individually labeled vials containing 95% ethanol. Genetic tissue samples collected from Atlantic and shortnose sturgeon will be sent for archival purposes to the NOAA/NOS Tissue Archive located in Leetown, WV. Proper certification, identity, and chain of custody of samples would be maintained during transfer of tissue samples.

Anesthesia with MS-222:

Fish selected for internal surgeries or fin ray removal will be anesthetized using buffered MS-222 (using a dose of up to 150 mg/L). Animals will be observed carefully to assess full narcotic state in preparation for invasive procedures. Movement and equilibrium will be monitored throughout to determine the depth of anesthesia and to ensure the condition of the animal. Upon completion of the surgery or lavage procedure, the fish will be returned to fresh water in either the live well of the boat or a boat-side net pen and assisted with ventilation by slowly moving the fish back and forth in the water while gently supporting it by the tail and under the body. We are fully experienced in use of MS-222 for anesthetizing sturgeon.

Telemetry Acoustic Tagging:

The total weight of tags would not exceed 2 percent of the fish's total body weight, sturgeon >56 cm FL would be tagged with VEMCO V16-5H acoustic tags, and sturgeon <56 cm FL would be tagged with VEMCO V7-4L; V9-6L; or V13-1H tags, depending on the weight of the individual sturgeon.

Surgery for Implanting Acoustic Tags:

The following 5 to 8-minute transmitter implantation surgery under anesthesia would be used. Just prior to the surgical procedure, fish would be removed from a buffered anesthetic bath (85 mg/L MS-222, Matsche 2011) and placed on a V-shaped measuring board. The incision site for implanting the tag (40 to 60 mm anterior to the pelvic fins, although the specific location would vary with fish size) would be disinfected with iodine (10 percent solution). A sterile surgical packet containing all surgical instruments and supplies would be used to make a 10 mm incision in individual fish selected for surgery. A sterilized sonic transmitter would be inserted into the surgical openings of sturgeon and the incision closed with interrupted sutures and treated with iodine to prevent infection. Post-surgery fish would be held in an aerated holding tank and released into the live well or net pen to recover from anesthesia. Under normal circumstances, total holding time (anesthesia induction, surgery, and recovery) would be 20 minutes or less. Internal tags would not be implanted in unhealthy or stressed fish.

Aging:

In order to better define stock structure we would attempt to age Atlantic and shortnose sturgeon captured in all river systems in South Carolina. The removal and processing of marginal fin rays will be modeled after the materials and methods described in Baremore & Rosati (2014). The second marginal fin ray will be isolated from the fin spine and neighboring fin rays using a scalpel, by making an incision of approximately 1 cm in length on either side of the fin ray, about 1 cm from the pectoral fin origin. A pair of fine-point nail clippers will then be used to cut through each end of the 1 cm segment and remove the fin ray from the fin. When possible, fin rays will be removed from both the left and right sides of each individual in order to determine whether there is consistency between age estimates from both sides. Fin rays will be stored in coin envelopes until they are processed in the lab.

Fin rays will be mounted in epoxy resin and allowed to harden for at least 24 hours. A Buehler IsoMet low speed saw with a single wheel will be used to acquire four transverse sections from 0.3 to 0.6 mm thick, as determined from preliminary processing of samples. Sections will be mounted on microscope slides with the mounting medium Cytoseal and examined under a dissecting microscope and digital images will be taken of each section using a real-time viewing camera. Growth bands will be counted using standard aging methods, where one band pair consists of one opaque and one translucent continuous ring.

Gonadal Biopsy

In instances where the sex of the Atlantic sturgeon is not readily apparent following laparoscopy, gonad biopsies will be taken for histological evaluation and sex determination. A 2-mm flexible biopsy tool will be inserted through the laparscopy sheath (no 2nd incision required) to obtain a small sample of gonadal tissue. The sample would be approximately 2 mm in size (1-2g) and would be placed in a solution (e.g., 10% neutral, buffered formalin) for preservation. Upon completion of the biopsy, the body cavity and biopsy site will again be visually assessed to ensure that there is no obvious hemorrhaged or herniated tissue. The laparoscope and the sheath (canulus) will be removed from the body and the incision closed with a single suture in a cruciate pattern using suture material.

Supplemental Information

Status of Species:	Atlantic Sturgeon: Listed as endangered under the ESA in the Carolina and South Atlantic DPSs. Shortnose sturgeon: Listed as endangered under the ESA throughout their range.
Intentional Lethal Take:	Intentional lethal take is proposed for early life stage (ELS) sampling in several action areas (Take Table 2 (Cooper), lines 5 and 10; Take Table 3 (Edisto), lines 5 and 10; Take Table 4 (Savannah), lines 5 and 10). ELS lethal take is unavoidable due to collection methods used and the preservation for laboratory processing. Moreover, we request one unintended sub-adult/adult mortality annually and one unintended juvenile mortality annually for both species resulting from research activities (Take Table 5). Netting will occur throughout the year in major South Carolina coastal rivers and the intensity of this research activity may result in an unintentional sturgeon mortality.
Anticipated Effects on Animals:	The risks to Atlantic and shortnose sturgeon by this project would typically occur in several discrete activities involving: netting, handling, PIT and external tagging, surgical implanting of acoustic tags, anesthesia, and aging. This section addresses the specific risks of each of these activities to both species.

Capture/Netting:
Capturing Atlantic and shortnose sturgeon in gillnets and trammel nets can result in injury and mortality, reduced fecundity, and delayed or aborted spawning migrations of sturgeon (Moser and Ross 1995, Collins et al. 2000, Moser et al. 2000; and Kahn and Mohead 2010). Historically, the major cause of mortality, though, has been reported due to the occlusion of gills when trapped in nets. However, sturgeon mortality during scientific research is also related to capture as a function of numerous factors including water temperature, low dissolved oxygen concentrations, soak time, mesh size, net composition, and netting experience.

Handling:
Routine handling and holding can result in raised levels of stress hormones in Atlantic and shortnose sturgeon. Atlantic and shortnose sturgeon are hardy species, generally tolerant of handling; nevertheless, they are sensitive to handling stress when water temperatures are high or dissolved oxygen concentration is low or they have been held for long periods of time. Additionally, sturgeon tend to inflate their swim bladder when stressed or handled in air (Moser et al. 2000). If not returned to neutral buoyancy prior to release, they tend to float and would be susceptible to sunburn and avian predators.

PIT and External Tagging:
Insertion of PIT and T-bar tags may impose cumulative handling stress on sturgeon, and tag insertion sites may also rarely become infected. When PIT tags are inserted into animals having large body sizes relative to the size of the tag, empirical studies have generally demonstrated that the tags have no adverse effect on the growth, survival, reproductive success, or behavior of individual animals. However, some fish, particularly juvenile fish could be affected if PIT tag insertion penetrates the body too deeply.

Genetic Tissue Sampling:
Tissue samples, clipped with sterile surgical scissors from the sections of soft pelvic or anal fins of captured sturgeon, do not appear to impair the sturgeon's ability to swim and is not thought to have any long-term adverse impact (Wydoski and Emery 1983).

Surgical Implantation of Acoustic Tags:

The surgical implantation of acoustic transmitters has the potential to injure or kill Atlantic and shortnose sturgeon. In general, direct effects of the proposed tagging procedure could include pain, handling discomfort, hemorrhage at the site of incision, and risk of infection from surgery. Delayed problems could include breakage of sutures, infection, affected swimming ability, and/or abandonment of spawning runs.

Anesthetizing using MS-222:

Risks associated with anesthetizing with MS-222 would include hypoxia from overexposure (typically caused by inexperience at recognizing the proper level of narcosis) (Coyle et al. 2004), anesthetizing fish in poor health or stressed condition, and from thrashing during the excited phase of anesthetic induction.

Aging:

Second marginal fin ray sections (1 cm) will be obtained using sterile instruments and the removal of a small section of fin ray is not thought to have any long-term adverse impacts.

Gonadal Biopsy:

Laparoscopic examinations have been used extensively in fisheries research and refined for sturgeon work (Hernandez-Divers et al. 2004); Matsche et al. 2011). Risks associated with the procedure are essentially the same as those listed above for the surgical procedures listed previously. The direct effects include pain, handling discomfort, hemorrhage at the site of incision, and risk of infection from surgery. Delayed problems could include breakage of sutures, infection, affected swimming ability, and/or abandonment of spawning runs.

Impacts from Further Incidental Takes for Monitoring in the Winyah/Pee Dee System:

Specific stressors associated with the proposed monitoring are similar to those mentioned above: capture, handling, PIT tagging, floy/dart tagging, genetic tissue sampling, anesthetizing, and implanting internal telemetry transmitters. In the Pee Dee River the Biological Opinion provides for 70 adult shortnose sturgeon and 50 subadult and 60 adult Atlantic sturgeon.

Additionally, the Pee Dee River Biological Opinion acknowledges that Atlantic sturgeon from each of the 5 DPSs are known to mix in the marine and riverine environment, and it is anticipated that individuals from any of the 5 Atlantic sturgeon DPSs could interact with the gillnetting activities associated with the monitoring. Sampling methods for the monitoring program must balance the need to tag fish from the Yadkin-Pee Dee River populations in order to assess the effects of the action, and the efficacy of capturing adequate numbers of fish in different parts of the river. Therefore, the following ranges will be applied to determine the anticipated take composition by Atlantic sturgeon DPS:

- Gulf of Maine DPS 0%-1% (0-1 Atlantic sturgeon)
- New York Bight DPS 2%-4% (2-5 Atlantic sturgeon)
- Chesapeake Bay DPS 1%-2% (1-2 Atlantic sturgeon)
- Carolina DPS 83%-93% (91-103 Atlantic sturgeon)
- South Atlantic DPS 2%-11% (2-12 Atlantic sturgeon)

Measures to Minimize Effects:

Capture/Netting:

Several methods will be implemented to minimize the stress and pain of sturgeon captured in gillnets and trammel nets. Overall sampling time, net set duration as well as handling time will be reduced when water temperatures are greater than 27°C since higher water temperatures have been found to be stressful for Atlantic and shortnose sturgeon (Moser et al. 2000, and Kahn and Mohead 2010). Periods of high water temperatures and low dissolved oxygen concentrations (<4.5 mg/L) have occurred in the past during the spring and summer seasons in areas proposed in these studies. Consequently, water quality will be monitored closely and sampling will not occur during periods of low dissolved oxygen concentrations or high water temperatures. If sturgeon are entangled in nets and gills are occluded, we will cut meshed to expedite their removal from the net. Further, if water quality causes sturgeon to become lethargic during sampling, for no apparent external reasons, sampling would cease as soon as possible, and any currently captured sturgeon would only be measured, weighed, photographed, PIT tagged, and genetic tissue sampled before it is recovered and released.

The shorter soak times we use while drift netting (30 minutes to 2 hours depending on tides), typically results in reduced pressure on the driftnets and less injury, stress, and/or

mortality experienced by captured fish. Also, because we will continually monitor drift nets at short intervals, sturgeon or non-target animals would be removed quickly from the nets, resulting in animals less likely to experience stress. Further, our close tending of drift nets would also reduce the risk of gear entanglement or gear loss resulting in ghost nets.

Handling:

Handling stress will be minimized by minimizing holding and handling time, particularly during periods of high water temperature or low dissolved oxygen concentrations, wearing smooth rubber/latex gloves during handling, and adding an electrolyte to water in the holding tank. Fish will be taken from the net and placed in holding tank, quickly identified, measured, weighed, tagged and immediately returned to the water as soon as possible. Fish will be measured on a measuring board and tagged in a cradle that support the length of the fish, and will be weighed in a moist nylon net bag.

PIT and External Tagging:

PIT tags are used for permanently marking and identifying individual captured fish are biologically inert and have been shown not to cause problems associated with some other methods of tagging fish, such as scarring and tissue damage or otherwise adversely affecting growth or survival (Brännäs et al. 1994). However, since smaller juvenile sturgeon are more difficult to properly PIT tag, and thus more susceptible to harming as a result of this procedure (Henne et al. 2008), we would only be using 8mm PIT tags on all smaller sturgeon, while tags of 11.9 mm would be used on sturgeon above 350 mm (TL). Also we would not tag animals smaller than 350mm with Floy/T-bar tags.

Genetic Tissue Sampling:

As stated, a small (1.0 cm²) tissue sample would be collected from the trailing margins of soft fin tissue (pectoral or dorsal fins) using sharp sanitized scissors. To minimize any impact of sampling tissue for genetic tissue samples, care would be used when collecting. Instruments would be changed or disinfected between each fish sampled to avoid possible disease transmission or cross contamination of genetic material. Tissue preservation and archiving will conform to permit conditions.

Surgical Implantation of Acoustic Tags:

Invasive tools used during the tagging process will be sterilized with isopropyl alcohol between uses on each fish. The incision area would also be swabbed with a disinfectant prior to making the incision. After surgery, betadine will be spread over the area to deter bacteria from entering the wound. Further, surgery to implant transmitters will only be attempted when fish are in excellent condition or if the water temperature <27° C or >7° C (sturgeon skin does not heal rapidly in high or low temperatures). We will follow the rule of not exceeding a combined weight of the tags greater than 2% of the fish's weight. Only animals larger than 300 mm TL will be telemetry tagged.

Anesthetizing using MS-222:

To reduce risks from using MS-222, only properly trained staff would be permitted to anesthetize animals; and only non-stressed animals in good health would be anesthetized. To avoid injury while being anesthetized, sturgeon would be restrained with netting to prevent animals from jumping or falling out the anesthetic bath. Fish would be monitored closely during induction to reach the proper level of anesthesia prior to surgery, and would be observed to ensure proper recovery from anesthetic narcosis prior to release. Also, because MS-222 is an acidifying solution, potentially extending the induction time for narcosis, bath solutions would be buffered to a neutral pH with sodium bicarbonate and oxygenated prior to use.

Aging:

As stated, a small (1.0 cm long) fin ray section would be collected from the second marginal fin ray using sanitized instruments. To minimize any impact of sampling fin rays for aging, care would be used when collecting. Instruments would be changed or disinfected between each fish sampled to avoid possible disease transmission.

Gonadal Biopsy:

Invasive tools used during the procedure will be sanitized with isopropyl alcohol between uses on each fish. The incision area will also be swabbed with a disinfectant prior to making the incision. After the procedure, povidone iodine will be spread over the area to deter bacteria from entering the wound. Laparoscopic examinations will only be attempted when fish

are in excellent condition, and only if the water temperature are less than 27° C (to reduce handling stress) or more than 7° C (due to slow rate healing in low temperatures). Laparoscopic procedures will only be used by researchers who have had proper training and experience.

Resources Needed to Accomplish Objectives: SCDNR has been involved with research on Atlantic and Shortnose Sturgeon since the early 80's. This research included capture, tagging, and radio and sonic tracking of both species sturgeon. Principal investigator Post has substantial experience in capture and telemetry of sturgeon. Field biologists are well trained and very experienced in capture and handling sturgeons.

Disposition of Tissues: Tissue samples (a 1 cm2 pectoral fin clips in buffer solution) will be collected for genetic analysis and provided to the NOAA sturgeon DNA bank in Leetown, WV.

Public Availability of Product/Publications: Results from current and future research are published either in agency documents or scientific journals. Both of which are accessible and available to the public.

Location/Take Information

Location

Research Area: Atlantic Ocean **State:** SC **Stream Name:** Santee River **Begin Mile:** **End Mile:** 90.0

Location Description: Santee River

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Adult/sub-adult Atlantic sturgeon (>100 cm (FL)) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
2		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile Atlantic sturgeon(<100 cm) will receive an acoustic tag; up to 10 fish will be processed for aging.														
3		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target all life stages to evaluate population structure and length at age; up to 20 fish will be processed for aging (fin ray clip). Sub-adult/Adult Atlantic sturgeon (>100 cmFL)														

4		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Juvenile	Male and Female	60	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target all life stages to evaluate population structure and length at age; up to 20 fish will be processed for aging (fin ray clip). Juvenile Atlantic sturgeon (<100cm FL)														
5		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Santee River. Adult shortnose sturgeon (>45 cm FL) will receive an acoustic tag, up to 10 fish will be processed for aging (fin ray clip)														
6		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Santee River. Juvenile shortnose sturgeon (<45 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
7		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	15	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sample will target sub-adult/adult shortnose sturgeon (>45cm FL) to evaluate population structure and length at age; up to 15 fish will be processed for aging (fin ray clip)														
8		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	15	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Santee River. Sample will target juvenile shortnose sturgeon (<45cm FL) to evaluate population structure and length at age; up to 15 fish will be processed for aging (fin ray clip)														
9	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Egg mat	Collect eggs (wild)	N/A	5/28/2020	3/31/2027
Details: Egg mat or D-frame														

Location

Research Area: Atlantic Ocean **State:** SC **Stream Name:** Cooper River **Begin Mile:** **End Mile:** 48.0

Location Description: Cooper River

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Adult/sub-adult Atlantic sturgeon (>100 cm FL) will receive an acoustic tag up to 10 fish will be processed for aging (fin ray clip)														
2		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile Atlantic sturgeon (<100cm FL); up to 10 fish will be processed for aging (fin ray clip)														
3		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Details: Cooper River. Sampling will target sub-adult/adult Atlantic sturgeon life stages to evaluate population structure and length at age; up to 10 fish will be processed for aging (fin ray clip)														
4		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target juvenile Atlantic sturgeon life stages to evaluate population structure and length at age; up to 10 fish will be processed for aging (fin ray clip)														
5		Sturgeon, Atlantic	Carolina (NMFS Endangered)	Wild	Egg/ Larvae	Unknown	50	1	Intentional (Directed) Mortality	Net, D-frame	Intentional (directed) mortality	N/A	3/31/2017	3/31/2027
Details: , egg mats or D-nets														
6	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, blood; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad	N/A	3/12/2019	3/31/2027

											biopsy; Weigh			
		Details: No more Adult/sub-adult shortnose sturgeon (>45 cm FL) will receive an acoustic tag, up to 10 fish will be processed for aging (fin ray clip)												
7		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
		Details: Juvenile shortnose sturgeon (<45 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)												
8		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	35	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
		Details: Sampling will target sub-adult/adult shortnose sturgeon life stages (>45cm FL) to evaluate population structure and length at age; up to 20 fish will be processed for aging (fin ray clip)												
9		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	5	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
		Details: Sampling will target juvenile shortnose sturgeon life stages (<45cm FL) to evaluate population structure and length at age; up to 5 fish will be processed for aging (fin ray clip)												
10		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Net, D-frame	Intentional (directed) mortality	N/A	3/31/2017	3/31/2027
		Details: egg mats or D-nets												

Location

Research Area: Atlantic Ocean State: SC Stream Name: Edisto River Begin Mile: End Mile: 125.0
Location Description: Edisto River

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
		Details: Adult Atlantic sturgeon (>100 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)												

2		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile Atlantic sturgeon (<100 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
3		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target subadult/adult Atlantic sturgeon life stages (>100cm FL) to evaluate population structure and length at age; up to 20 fish will be processed for aging (fin ray clip)														
4		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Juvenile	Male and Female	700	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target juvenile Atlantic sturgeon life stages (<100cm FL) to evaluate population structure and length at age; up to 50 fish will be processed for aging (fin ray clip)														
5		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Net, D-frame	Intentional (directed) mortality; Measure; Photograph/Video	N/A	3/31/2017	3/31/2027
Details: Egg matt or D-Framed Net														
6		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	5	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Adult shortnose sturgeon (>45 cm FL) will receive an acoustic tag; up to 5 fish will be processed for aging (fin ray clip)														
7		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	5	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile shortnose sturgeon (<45 cm FL) will receive an acoustic tag; up to 5 fish will be processed for aging (fin ray clip)														
8	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/12/2019	3/31/2027
Details: Sampling will target subadult/adult life stages (>45cm FL) to evaluate population structure and length at age; up to 5 fish will be processed for aging (fin ray clip)														

9	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/12/2019	3/31/2027
Details: Sampling will target juvenile shortnose sturgeon life stages (<45cm FL) to evaluate population structure and length at age; up to 5 fish will be processed for aging (fin ray clip)														
10		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1		Net, D-frame	Intentional (directed) mortality	N/A	3/31/2017	3/31/2027
Details: Egg matt or D-Framed Net														

Location

Research Area: Atlantic Ocean **State:** SC **Stream Name:** Savannah River **Begin Mile:** **End Mile:** 188.0

Location Description: Savannah River

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Laparoscopy ; Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Sub-adult/Adult Atlantic sturgeon (>100 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
2		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile Atlantic sturgeon (<100 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
3		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Adult	Male and Female	30	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target subadult/adult Atlantic sturgeon life stages to evaluate population structure and length at age; up to 50 fish will be processed for aging (fin ray clip)														

4		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Juvenile	Male and Female	70	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Savannah River. No more than ten Shortnose sturgeon >56 cm FL will receive an acoustic tag, and no more than ten Shortnose sturgeon <56 cm will receive an acoustic tag; up to 20 fish will be processed for aging (fin ray clip)														
5		Sturgeon, Atlantic	South Atlantic (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Net, D-frame	Intentional (directed) mortality	N/A	3/31/2017	3/31/2027
Details: Egg matt or D-Framed Net														
6		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Subadult/adult shortnose sturgeon (>45 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
7		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize; Instrument, internal (e.g., VHF, sonic); Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, gonad biopsy; Weigh	N/A	3/31/2017	3/31/2027
Details: Juvenile shortnose sturgeon (<45 cm FL) will receive an acoustic tag; up to 10 fish will be processed for aging (fin ray clip)														
8		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	60	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target subadult/adult shortnose sturgeon life stages (>45cm FL) to evaluate population structure and length at age; up to 50 fish will be processed for aging (fin ray clip)														
9		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	40	1	Capture/Handle/Release	Net, Gill	Mark, dart; Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Weigh	N/A	3/31/2017	3/31/2027
Details: Sampling will target juvenile shortnose sturgeon life stages (<45cm FL) to evaluate population structure and length at age; up to 50 fish will be processed for aging (fin ray clip)														
10		Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Net, D-frame	Intentional (directed) mortality	N/A	3/31/2017	3/31/2027
Details: Egg matt or D-Framed Net														

Location

Research Area: Atlantic Ocean State: SC Stream Name: SC Rivers

Location Description: SC Rivers

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1	B	Sturgeon, Atlantic	Range-wide (NMFS Endangered/Threatened)	Wild	Adult	Male and Female	1	1	Unintentional mortality	Net, Gill	Unintentional mortality	N/A	3/12/2019	3/31/2027
Details: Waccamaw River, Santee River, Cooper River, Edisto River, and Savannah River; subadult/adult Atlantic sturgeon (>100cm FL)														
2	B	Sturgeon, Atlantic	Range-wide (NMFS Endangered/Threatened)	Wild	Juvenile	Male and Female	1	1	Unintentional mortality	Net, Gill	Unintentional mortality	N/A	3/12/2019	3/31/2027
Details: Waccamaw River, Santee River, Cooper River, Edisto River, and Savannah River; juvenile Atlantic sturgeon (<100cm FL)														
3	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	1	1	Unintentional mortality	Net, Gill	Unintentional mortality	N/A	3/12/2019	3/31/2027
Details: Waccamaw River, Santee Cooper Lakes, Santee River, Cooper River, Edisto River, and Savannah River; subadult/adult shortnose sturgeon (>45cm FL)														
4	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	1	1	Unintentional mortality	Net, Gill	Unintentional mortality	N/A	3/12/2019	3/31/2027
Details: Waccamaw River, Santee Cooper Lakes, Santee River, Cooper River, Edisto River, and Savannah River; juvenile shortnose sturgeon (<45cm FL)														

Location

Research Area: Atlantic Ocean State: SC Stream Name: Winyah Bay System Begin Mile: 0.0 End Mile: 300.0

Location Description: System includes Great Pee Dee River, Sampit River, Black River, Waccamaw River, Little Pee Dee River, Lynches River, Winyah Bay, and contiguous channels of the Intracoastal Waterway.

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1	F	Sturgeon, Atlantic	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	500	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027
Details: 10 total sturgeon per year will receive internal transmitters.														

3	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	100	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027
Details: 10 total sturgeon per year will receive internal transmitters.														
4	F	Sturgeon, Atlantic	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Egg mat	Collect eggs (wild)	N/A	5/28/2020	3/31/2027
Details: Egg mats and D-frame, per year in the Great Pee Dee River.														
5	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/Larvae	Unknown	50	1	Intentional (Directed) Mortality	Egg mat	Collect eggs (wild)	N/A	5/28/2020	3/31/2027
Details: Egg mats and D-frame, per year in the Great Pee Dee River.														
6	F	Sturgeon, Atlantic	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize (e.g. MS-222); Anesthetize (Electronarcosis); Instrument, internal (e.g., VHF, sonic); Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027
Details: Only 10 sturgeon total per year will receive internal transmitters.														
7	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	10	1	Capture/Handle/Release	Net, Gill	Anesthetize (e.g. MS-222); Anesthetize (Electronarcosis); Instrument, internal (e.g., VHF, sonic); Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027
Details: Only 10 sturgeon total per year will receive internal transmitters.														
8	F	Sturgeon, Atlantic	Range-wide (NMFS Endangered)	Wild	Subadult/Adult	Male and Female	200	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027

9	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Subadult/ Adult	Male and Female	50	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (leading ray); Sample, fin ray clip (second ray); Weigh	N/A	5/28/2020	3/31/2027
---	---	---------------------	------------------------------	------	-----------------	-----------------	----	---	------------------------	-----------	--	-----	-----------	-----------

Location

Research Area: Atlantic Ocean **State:** SC **Stream Name:** Santee Cooper Lakes - Lakes Moultrie and Marion and tributaries, SC

Location Description: Assessing Lake Population of SNS; Work will only occur when FERC license for S-C is issued. (Congaree and Wateree Rivers, Lake Marion and Lake Moultrie, and the diversion canal)

Take Information

Line	Ver	Species	Listing Unit/Stock	Production /Origin	Life Stage	Sex	Expected Take	Takes Per Animal	Take Action	Observe /Collect Method	Procedure	Transport Record	Begin Date	End Date
1	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	75	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (second ray); Weigh	N/A	3/12/2019	3/31/2027
2	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Adult	Male and Female	20	1	Capture/Handle/Release	Net, Gill	Anesthetize (e.g. MS-222); Anesthetize (Electronarcosis); Instrument, internal (e.g., VHF, sonic); Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (second ray); Weigh	N/A	3/12/2019	3/31/2027
3	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	5	1	Capture/Handle/Release	Net, Gill	Mark, PIT tag; Measure; Sample, fin clip (genetic); Sample, fin ray clip (second ray); Weigh	N/A	3/12/2019	3/31/2027
4	B	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Juvenile	Male and Female	5	1	Capture/Handle/Release	Net, Gill	Anesthetize (e.g. MS-222); Anesthetize (Electronarcosis); Instrument, internal (e.g., VHF, sonic); Mark, PIT tag; Measure; Photograph/Video; Sample, fin clip (genetic); Sample, fin ray clip (second ray); Weigh	N/A	3/12/2019	3/31/2027
5	F	Sturgeon, shortnose	Range-wide (NMFS Endangered)	Wild	Egg/ Larvae	Unknown	50	1	Intentional (Directed) Mortality	Egg mat	Collect eggs (wild)	N/A	5/28/2020	3/31/2027
		Details: egg mats and D-frame												

NEPA Checklist

1) If your activities will involve equipment (e.g., scientific instruments) or techniques that are new, untested,or otherwise have unknown or uncertain impacts on the biological or physical environment , please discuss the degree to which they are likely to be adopted by others for similar activities or applied more broadly.

Telemetry methodology and techniques combined with traditional netting protocol, to capture sturgeon, would not be considered new.

2) If your activities involve collecting, handling, or transporting potentially infectious agents or pathogens (e.g., biological specimens such as live animals or blood), or using or transporting hazardous substances (e.g., toxic chemicals), provide a description of the protocols you will use to ensure public health and human safety are not adversely affected, such as by spread of zoonotic diseases or contamination of food or water supplies.

The anesthetic MS-222 is a potential slight irritant to the eyes, respiratory system and skin when allowed to become airborne. The chemical will be handled with care and kept contained while not in use. It will be pre-measured prior to sampling in the field, and it will be immediately dissolved into an aqueous solution of low concentrations. Researchers will wear latex gloves when handling fish anaesthetized with MS-222. First aid measures involve flushing eyes, mouth and/or skin with copious amounts or water. A physician will be contacted ifnegative reactions persist.

3) Describe the physical characteristics of your project location, including whether you will be working in or near unique geographic areas such as state or National Marine Sanctuaries, Marine Protected Areas, Parks or Wilderness Areas, Wildlife Refuges, Wild and Scenic Rivers, designated Critical Habitat for endangered or threatened species, Essential Fish Habitat, etc. Discuss how your activities could impact the physical environment, such as by direct alteration of substrate during use of bottom trawls, setting nets, anchoring vessels or buoys, erecting blinds or other structures, or ingress and egress of researchers, and measures you will take to minimize these impacts.

Sampling in SC Rivers will not impact the terrestrial areas as it will occur away from the boundaries in riverine habitat. Part of our studies will potentially occur in areas having EFH for federally managed species such as red drum and flounder, however, the netting activity on the bottom substrate and the boating activities on the surface are not expected to impact the EFH.

4) Briefly describe important scientific, cultural, or historic resources (e.g., archeological resources, animals used for subsistence, sites listed in or eligible for listing in the National Register of Historic Places) in your project area and discuss measures you will take to ensure your work does not cause loss or destruction of such resources. If your activity will target marine mammals in Alaska or Washington, discuss measures you will take to ensure your project does not adversely affect the availability (e.g., distribution, abundance) or suitability (e.g., food safety) of these animals for subsistence uses.

Our activities will not occur in the above mentioned areas.

5) Discuss whether your project involves activities known or suspected of introducing or spreading invasive species, intentionally or not, (e.g., transporting animals or tissues, discharging ballast water, use of equipment at multiple sites). Describe measures you would take to prevent the possible introduction or spread of non-indigenous or invasive species, including plants, animals, microbes, or other biological agents.

Our boat trailer will be cleaned and the bilge will be flushed prior to moving to a new watershed area to prevent spread of unwanted invasive species. We will provide samples of genetic tissue, taken from shortnose and Atlantic sturgeon and preserved in ethyl alcohol vials, to the NOAA NOS archive in Leetown, WV as part of our research activities. We would not expect possible spread of an invasive species resulting from this activity.

Project Contacts

Responsible Party: Bill Post

Primary Contact: Bill Post

Principal Investigator: Bill Post

Other Personnel	
Name	Role(s)

Danielle M Carty	Co-Investigator
Amy Cottrell	Co-Investigator
Derek Crane	Co-Investigator
Tanya Darden	Co-Investigator
Jeremy Grigsby	Co-Investigator
Allan Hazel	Co-Investigator
David Hood	Co-Investigator
Corbett Norwood	Co-Investigator
Natalia Przelomska	Tissue Sample Disposition
Daniel Russ	Co-Investigator
Alyssa Schmit	Co-Investigator
Anna E Turano	Co-Investigator
Ellen Waldrop	Co-Investigator

Attachments

- Application Archive - (Added Mar 31, 2017)
- Certification of Identity - (Added May 13, 2016)
- Contact - Allan Hazel (Added Jun 21, 2010)
- Contact - Allan Hazel (Added Sep 3, 2010)
- Contact - Allan Hazel (Added May 13, 2016)
- Contact - Alyssa Schmit (Added Feb 18, 2021)
- Contact - Amy Cottrell (Added Mar 11, 2020)
- Contact - Anna E Turano (Added Mar 11, 2020)
- Contact - Bill Post (Added May 13, 2016)
- Contact - Corbett Norwood (Added Sep 3, 2010)
- Contact - Daniel Russ (Added May 13, 2016)
- Contact - Danielle M Carty (Added Mar 11, 2020)
- Contact - David Hood (Added Mar 11, 2020)
- Contact - Derek Crane (Added Dec 3, 2019)
- Contact - Ellen Waldrop (Added May 13, 2016)
- Contact - Ellen Waldrop (Added Mar 13, 2020)
- Contact - Jeremy Grigsby (Added May 13, 2016)
- Contact - Tanya Darden (Added Aug 11, 2016)
- Resources Needed - (Added Aug 1, 2016)

Status

- Application Status: Application Complete
- Date Submitted: May 13, 2016
- Date Completed: January 12, 2017

FR Notice of Receipt Published:

January 18, 2017

Number: 2017-00956

Comment Period Closed:

February 17, 2017

Comments Received: No

Comments Addressed: No

Last Date Archived:

March 16, 2021

• ESA Section 10(a)(1)(A) permit (other)

Current Status: Issued

Status Date: March 31, 2017

Section 7 Consultation: Programmatic

NEPA Analysis: Categorical Exclusion

Date Cleared by General Counsel: March 23, 2017

FR Notice of Issuance/Denial Published: April 7, 2017

Notice Number: 2017-07000

Expire Date: March 31, 2027

Analyst Information:

- 1) Erin Markin

Phone: (301)427-8416

Email: erin.markin@noaa.gov
- 2) Malcolm Mohead

Phone: (301)427-8427

Fax: (301)713-0376

Email: Malcolm.Mohead@noaa.gov

Modification Requests

Modifications Requested						
Number	Title	Description	Status	Date Submitted	Date Issued	Issued Version
2	SCDNR request for increased takes in specific river systems	Please see attached explanation. Please remove Mark D'Ercole as a CI.	Issued	08/01/2018	03/12/2019	
3	Add authorized recipient to Permit No. 20528	Please add Dr. Natalia Przelomska as an authorized recipient to Permit No. 20528. Dr. Przelomska will be conducting genetic analyses of Atlantic and shortnose sturgeon tissue samples to meet our permit objectives.	Issued	02/14/2019	02/14/2019	
4	SCDNR request for increased takes in the Savannah River	The following amendments are requested for permit #20528: Purpose: To request a necessary increase in allowable take for shortnose sturgeon in the Savannah River, SC. All capture methods, handling and processing, PIT tagging, Floy tagging, Genetic Tissue Sampling, Telemetry Acoustic Tagging (where applicable), Surgery Protocol (where applicable), Fin Ray Sampling, and Anesthesia (where applicable), will be conducted in a same manner as currently required in permit #20258. All sampling and handling of sturgeon will be conducted following the guidelines established in "A Protocol For the Use of Shortnose Atlantic, Gulf, and Green Sturgeon" (Kahn and Mohead 2010). All necessary precautions will be taken to ensure sturgeons are not harmed during capture and handling. Location/Description: Savannah River As part of the Savannah Harbor Expansion Project (SHEP),	Withdrawn	04/29/2019		

		<p>in 2013 the U.S. Army Corps of Engineers (USACE)-Savannah District committed to monitor the distribution of sturgeon within the Savannah River Estuary. As a result, the South Carolina Department of Natural Resources (SCDNR) was contracted to conduct a telemetry study pre-construction, during construction, and post-construction to collect movement data for both species of sturgeon and report findings to USACE. Detection data collected during this study is used to identify patterns of movement regarding seasonal distribution and spawning migrations. This work is accomplished through the use of an array of ~60 acoustic receivers that are able to detect both species of sturgeon tagged with transmitters. Additionally, SCDNR inserts 10 sonic transmitters each year into Atlantic sturgeon and 10 sonic transmitters into shortnose sturgeon (50/50 split between adults/sub-adults and juvenile fish for each species). The results of this multi-year study indicate how SHEP is affecting populations of Atlantic and shortnose sturgeon in the Savannah River Watershed. Take: Because SCDNR exceeded the allowed take for shortnose sturgeon in 2018, we would like to request an increase in take for this river. Justification for this request is based on several features of SHEP research objectives. First, the SHEP study began in 2015, two years before the current permit was issued. The previous issued ESA permit (#15677), on which SCDNR was operating, provided no length restrictions for specific life stages. Likewise, the statement of work (SOW) for the SHEP study mandates SCDNR acoustically tag up to 10 juvenile and 10 adult SNS per year. In the developed study plan, SCDNR indicated any fish <600 millimeters (mm) fork length (FL) would be considered juveniles and any fish >600mm FL would be considered adult. SCDNR has operated using these length definitions from 2015–present. This framework causes length discrepancies associated with assigned life stages provided in SCDNR's current ESA permit (#20528), where SNS <450mm FL are considered juveniles and SNS >450 mm FL are adults. SCDNR rarely catches SNS <450 mm FL, so most SHEP study captures are considered adult SNS by permit specifications. Complicating this is the fact SCDNR is required to report to USACE on the Federal Calendar (Oct-Sept), rather than using a traditional calendar year (Jan-Dec). This also has the potential to result in SCDNR exceeding annual takes in a given calendar year for adult SNS while attempting to meet USACE objectives. Therefore, SCDNR requests to modify the existing permit for the Savannah River to allow 20 adult shortnose sturgeon be captured and receive transmitters per year, instead of the current allowable take of 10. This modification should prevent any future overages due to either differences in assigned lengths or reporting periods.</p>				
5	SCDNR Co-PI addition	Please add Dr. Derek Crane as a Co-investigator to permit # 20528. His CV is attached.	Issued	12/03/2019	12/18/2019	
6	Amendments for Permit #20528-02	Please see attached documents outlining all requests.	Issued	03/10/2020	05/28/2020	
7	Addition of Alyssa Schmit as a Co-Investigator	Add Alyssa Schmit as a Co-Investigator to conduct research on Atlantic and shortnose sturgeon in SC waters.	Issued	02/18/2021	03/15/2021	

Reports

Reports Required					
Nbr	Report Type	Report Period		Date Due	Status
		Start Date	End Date		
					Date Received

1	Annual	04/01/2017	12/31/2017	02/01/2018	Submitted	02/14/2018
1	Incident	04/01/2017	12/31/2017	02/01/2018	Submitted	02/22/2018
2	Annual	01/01/2018	12/31/2018	02/01/2019	Submitted	02/01/2019
3	Annual	01/01/2019	12/31/2019	02/01/2020	Submitted	01/31/2020
4	Annual	01/01/2020	12/31/2020	02/01/2021	Submitted	02/01/2021
5	Annual	01/01/2021	12/31/2021	02/01/2022	N/A	
6	Annual	01/01/2022	12/31/2022	02/01/2023	N/A	
7	Annual	01/01/2023	12/31/2023	02/01/2024	N/A	
8	Annual	01/01/2024	12/31/2024	02/01/2025	N/A	
9	Annual	01/01/2025	12/31/2025	02/01/2026	N/A	
10	Combined Annual/Final	01/01/2026	03/31/2027	05/01/2027	N/A	
11	Incident	01/01/2018	12/31/2018	12/31/2018	Submitted	04/11/2019